

## A Revision of the Genus *Nephopterix* Hübner (Lepidoptera, Pyralidae, Phycitinae, Phycitini) from Korea

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**Abstract** The Korean species of genus *Nephopterix* Hübner, 1825 is revised. Seven species of genus Korea are treated. Among them, one species, *Nephopterix paraexotica* is described as new to science and two species, *N. fumella* (Eversmann) and *N. tomisawai* Yamanaka, are recorded for the first time from Korea. Adults, wing venations, and genitalia of both sexes are illustrated. Collecting data and biological informations for the species are also given. Keys to all known species of the genus based on external and genitalic characters are provided.

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**Key words** Lepidoptera, Pyralidae, Phycitinae, Phycitini, *Nephopterix*, systematics

### INTRODUCTION

The pyralid genus *Nephopterix* Hübner is one of the largest genus of the subfamily Phycitinae and is widely distributed throughout the world. The genus, was erected by Hübner, 1825 (type species: *Tinea angustella* Hübner, 1796), are so uniform in coloration and markings of the forewings, that the species are often confused to separate them by in separation by the external characters.

In Korea, Leech (1901) reported one species, *N. hostilis* collected from Gensan (= Weonsan), N. Korea in 1886, of the genus for the first time. After then, Okamoto (1924) added *N. bicolorella*, and Inoue (1982) reported an additional species, *N. maenamii* from Is. Jeju in S. Korea. Park (1993) reported *N. exotica* from Mts Myohyang and Daesung in N. Korea. Recently, Choi, Paek, and Bae (1999) added one species, *Nephopterix immatura*. As a result, a total of five species of genus *Nephopterix* has hitherto been known to occur in the Korean peninsula. But, one recorded species, *N. hostilis*, was not included in this study because its status is uncertain.

In the present study, seven Korean species are dealt with, among them, one species is described as new species and two species are reported for the first time from Korea.

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Materials examined are preserved in Department of Biology, University of Incheon, Korea. Abbreviations used are as follows: UIB- Department of Biology, University of Incheon, Incheon; CIS- Center for Insect Systematics, Kangwon National University, Chuncheon; NIAST- National Institute of Agricultural Science and Technology, Suwon; TL- Type locality. Abbreviations for the provincial names are as follows: SP- South Pyungan; NP- North Pyungan; GW- Gangweon; GG- Gyunggi; CN- Chungnam; GB- Gyungbug; JN- Jeonnam; JJ- Jeju.

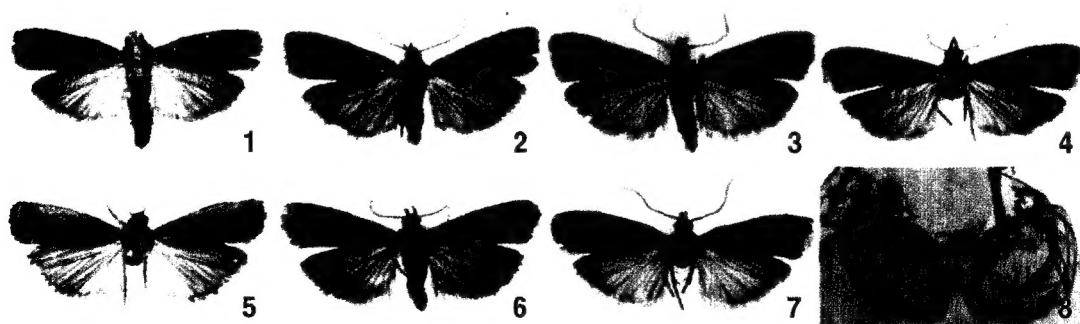
### Genus *Nephopterix* Hübner, 1825

*Nephopterix* Hübner, 1825, Verz. bakannter Schmett.: 370. Type species: *Tinea angustella* Hübner, 1796.

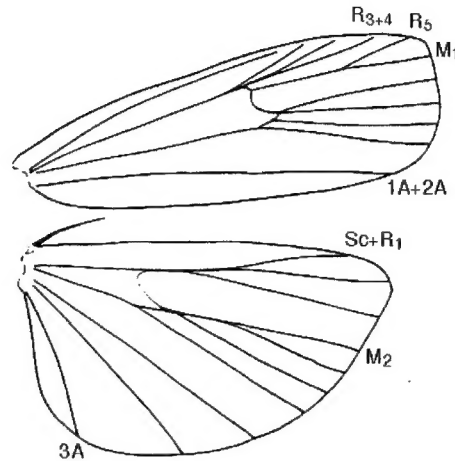
**Adult** (Figs 1–7). Variable in size; wing expanse, 15–29 mm. Head normal phycitid type, covered with slightly raised scales. Labial palpus strongly upturned, covered with smooth scales. Antennae filiform, 0.6–0.8 times as long as costa of forewing, both sexes with sensilla trichodea; male broadly swelled at base of flagellum; female simple.

**Forewing** (Fig. 9). Elongate triangular or subtriangular, with 11 veins;  $R_2$  from near angle of discal cell;  $R_2$  and  $R_{3+4}$  stalked for about  $1/4$  their lengths;  $R_5$  and  $M_1$  stalked for about  $1/2$  their lengths;  $M_1$  from below upper angle of discal cell, more or less straight;  $M_2$  and  $M_3$  connate, from angle of discal cell;  $CuA_1$  from between  $M_3$  and  $CuA_2$ , from near angle of discal cell;  $CuA_2$  from before lower outer angle of discal cell. Hindwing. Subtrapezoidal, with 8 veins;  $Sc+R_1$  and  $Rs$  shortly stalked;  $Rs$  and  $M_1$  shortly stalked near base;  $M_2$  and  $M_3$  stalked for about  $1/4$  their lengths;  $CuA_1$  from angle of discal cell;  $CuA_2$  from about  $3/4$  of discal cell; discal cell small, about  $2/5$  length of the wing.

**Male genitalia** (Figs 10, 17). Uncus subtriangular with rounded apex, dorsally covered with very short hairs. Apical process of gnathos arrowhead-shaped, slightly hooked, pointed at apex; juxta U-shaped, with slender lateral arm. Valva narrow, rounded at apex; basal  $2/3$  of costa well sclerotized; harpe small,



**Figs 1–8.** Phycitinae spp., adults (figs 1–7), second abdominal sternite and tympanic organ (fig. 8): 1. *Nephopterix bicolorella* Leech, ♂; 2. *Nephopterix exotica* Inoue, ♀; 3. *Nephopterix paraexotica* sp. nov., ♂, paratype; 4. *Nephopterix maenamii* Inoue, ♀; 5. *Nephopterix immatura* Inoue, ♀; 6. *Nephopterix tomisawai* Yamanaka, ♀; 7. *Nephopterix fumella* (Eversmann), ♂; 8. *Nephopterix bicolorella* Leech.



**Fig. 9.** Venation of *Nephopterix bicolorella* Leech.

subtriangular, with small hairs; sacculus narrow, weakly developed. Vinculum short, rectangularly developed, rather deeply split at base, about 0.6 times as long as valva. Aedeagus broad, almost of same length as valva one; cornuti anchor-like, two, armed with numerous small thorn. Structure of 8th abdomen shown in fig. 17.

Female genitalia (Fig. 23). Apophysis posterioris rather long, about 1.2 times as long as apophysis anterioris. Ostium bursae large. Ductus bursae broad, with small numerous minute dentes on inner surface; colliculum laterally thicken, rather short, about 1/3 of ductus bursae. Ductus seminalis, membranous, originating from a third of posterior of corpus bursae. Corpus bursae ovate, densely covered with small numerous short spines on inner surface; signum large, ovate, consists of numerous spines.

**Biology.** Univoltine. The species mostly appear during summer in Korea and Japan. Hibernation unknown. The larvae feed on leaves of various trees: *Populus macimowiczii* H. and *Salix* sp. (Salicaceae) (Ko, 1969; Park, 1983b), *Pyrus serotina* R. (Rosaceae) and *Quercus* sp. (Fagaceae) (Park, 1983a), *P. ussuriensis* var. *macrostipes* (Nak.) T. Lee (Rosaceae) (Park, Choi, and An, 1988), *P. ussuriensis* var. *macrostipes* (Nak.) T. Lee (Rosaceae) and *Quercus* sp. (Fagaceae) (Jeong, Lee, and Byun, 1995) in Korea; *Rhododendron mucronulatum* Turcz (Ericaceae) in Japan (Yamanaka, 1986).

**Distribution.** Cosmopolitan.

**Remarks.** The genus is morphologically similar to *Meroptera* Grote (type species: *Pempelia pravella* Grote, 1882), but it can be distinguished by the following characters: valva simple, slender, and ductus bursae differently sclerotized (Heinrich, 1956).

#### Key to the species of *Nephopterix* Hübner based on external characters

1. Forewing with two reddish brown transversal lines ..... *bicolorella* Leech
- Forewing without such lines ..... 2
2. Basal area of forewing reddish brown or pale reddish brown ..... 3

- Basal area of forewing grayish brown or dark gray ..... 5
- 3. Submarginal line of forewing distinct ..... 4
- Submarginal line of forewing obscure ..... *fumella* (Eversmann)
- 4. Costal area of forewing broadly suffused with dirty white scales; small in size (15–18 mm) .....  
..... *paraexotica* sp. nov.
- Costal area of forewing without such patch; large in size (24–26 mm) ..... *exotica* Inoue
- 5. Basal area of forewing dark gray; antemedian line of forewing nearly straight .... *tomisawai* Yamanaka
- Basal area of forewing grayish brown; antemedian line of forewing slightly bent ..... 6
- 6. Antemedian line of forewing broad, dark yellowish brown ..... *maenamii* Inoue
- Antemedian line of forewing narrow, pale grayish brown ..... *immatura* Inoue

#### Key to the species of *Nephopterix* Hübner based on genitalic characters

- 1. Cornutus absent ..... 2
- Cornutus present ..... 3
- 2. Aedeagus small; corpus bursae anteriorly rounded ..... *immatura* Inoue
- Aedeagus large; corpus bursae shallow anteriorly divided ..... *maenamii* Inoue
- 3. Cornutus anchor-like, armed with numerous small thorn ..... *bicolorella* Leech
- Cornutus thorn-like ..... 4
- 4. A single cornutus ..... *tomisawai* Yamanaka
- Cornuti two or three ..... 5
- 5. Cornuti two ..... *fumella* (Eversmann)
- Cornuti three ..... 6
- 6. Apical process of gnathos long, slender ..... *exotica* Inoue
- Apical process of gnathos thorn-like, subtriangular ..... *paraexotica* sp. nov.

#### *Nephopterix bicolor ella* Leech 줄노랑알락명나방

(Figs 1, 8–10, 17, 23)

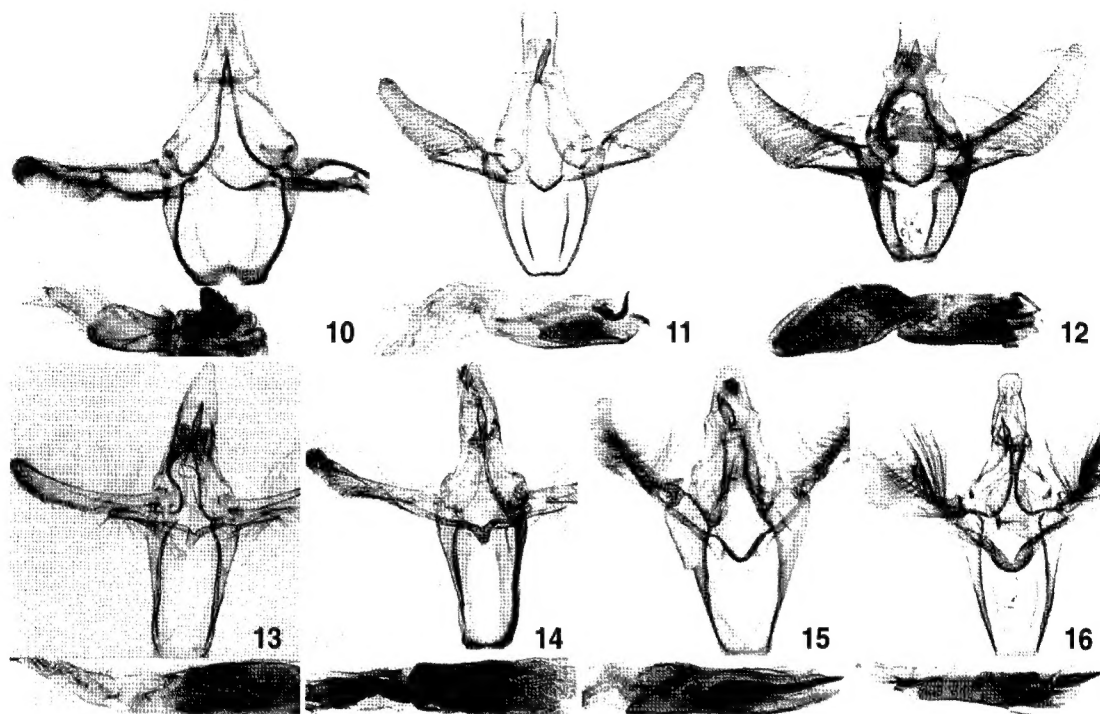
*Nephopterix bicolor ella* Leech, 1889, Entom. 22: 108, pl. 5: 5. TL: Japan.

*Nephopterix bicolor ella*: Leech, 1901: 407; Okamoto, 1924: 148; Inoue, 1954, Check list Lep. Japan, II: 135; Cho, 1963: 174; For. Res. Inst., 1969: 94; Kor. Soc. Pl. Prot., 1972: 139; Inoue, 1982, 1: 391, 2: 250, pl. 47: 26; Park, 1983a: 151; Park, 1983b: 428, pl. 29: 476; Park, Choi, and An, 1988: 200; Park, 1993, 32 (2): 162; Check list Ins., Korea, 1994: 338; Jeong, Lee, and Byun, 1995: 133.

*Nephoptyx* [sic] *bicolorella*: Zool. Soc. Kor., 1968: 49.

**Diagnosis.** This species can be easily distinguished from the other species by the inside of antemedian line of forewing with two reddish brown transversal lines.

**Adult** (Fig. 1). Wing expanse, 25–29 mm. Head silvery white. Labial palpus rather small, upturned, pale yellowish brown. Antenna pale yellowish brown, with sensilla trichodea of flagellum moderately abundant; male broadly swelled at base of flagellum, silvery white; sinus distinct. Thorax pale yellowish



**Figs 10-16.** Phycitinae spp., male genitalia: 10. *Nephopterix bicolorrella* Leech; 11. *Nephopterix exotica* Inoue; 12. *Nephopterix paraexotica* sp. nov., holotype; 13. *Nephopterix maenamii* Inoue; 14. *Nephopterix immatura* Inoue; 15. *Nephopterix tomisawai* Yamanaka; 16. *Nephopterix fumella* (Eversmann).

brown; patagium pale yellowish brown mixed with dirty white; tegula pale yellowish brown mixed with reddish brown. Ground color of forewing above dark gray mixed with reddish brown; antemedian line reddish brown; inside of antemedian line pale yellow, with two reddish brown transversal lines; submarginal line dark brownish gray, waved. Hindwing smoky fuscous; basal half rather paler than distal half.

Male and female genitalia. As described for the genus.

*Material examined.* GW- 1 ♂, Mt. Jeombong, 11 VII 1997 (Paek *et al.*); UIB, gen. sl. no. UIB-2004 (♂), 1 ♂, same locality, 13 VII 1997 (Paek *et al.*); UIB, 1 ♂, same locality, 5 VIII 1997 (Y.S. Bae & N.H. Ahn), UIB; 2 ♂, Jinbu-ryeung, Injae, 7 VII 1998 (Bae, Ahn, & Kim), UIB; 1 ♂, 1 ♀, Mt. Gyeong, 7 VIII 1997 (Y.S. Bae & N.H. Ahn), UIB, gen. sl. no. UIB-1608 (♀); 1 ♂, 1 ♀, Mt. Odae, 8 VII 1998 (Bae, Ahn, & Kim), UIB; 1 ♂, Undoo-ryeong, Pyengchang, 9 VII 1998 (Bae *et al.*); UIB; 4 ♂, 3 ♀, Mt. Balgyo, Hweongsung, 7 VII 1998 (Paek, Lee, Kim, & Song), UIB; 1 ♂, Mt. Gariwang, 8 VII 1998 (Paek, Lee, Kim, & Song), UIB; 2 ♂, Mt. Chiak, 12 VII 1997 (Y.B. Bae & N.H. Ahn), UIB, gen. sl. no. UIB-1609 (♂), 1 ♀, same locality, 16 VII 1998 (Bae, Ahn, & Kim), UIB, 1 ♀, same locality, 5 VIII 1998 (Bae *et al.*); UIB, gen. sl. no. UIB-2005 (♀). GG- 1 ♀, Mt. Gwangdeok, 20 VII 1996 (Bae, Paek, & Lee), UIB; 1 ♂, Mt. Hwaak, 25 VIII 1998 (Paek, Ahn, & Kim), UIB; 1 ♂, Mt. Myeongseong, Cheolweon, 20

VII 1999 (Paek, Lee, & Oh), UIB; 4 ♂, 2 ♀, Mt. Soyo, 7 VII 1996 (Bae, Paek, Lee, & Ahn), UIB; 1 ♂, Mt. Hwaya, 18 VII 1997 (Bae *et al.*); UIB; 1 ♂, Mt. Many, Is. Ganghwa, 20 VI 1997 (M.K. Paek & B.W. Lee), UIB. GB- 1 ♀, Mt. Sobaek, 17 VII 1998 (Paek, Lee, & Song), UIB; 1 ♂, Mt. Seondal, Youngju, 29 VI 1998 (Y.S. Bae & M.K. Paek), UIB; 2 ♂, Mt. Eorae, Youngju, 30 VI 1998 (Y.S. Bae & M.K. Paek), UIB; 1 ♂, Mt. Baekam, 15 VII 1999 (Lee, Kim, & Kim), UIB. JN- 1 ♂, Mt. Baegun, Gwangyang, 19 VII 1998 (Bae *et al.*); UIB; 2 ♂, Mt. Deogyu, Muju, 18 VII 1998 (Ahn, Kim, & Song), UIB.

*Previous Record.* Choi (1963): Is. Jeju (S. Korea); Park (1983a): Mt. Seolak, Is. Jeju (S. Korea); Park (1993): Mt. Myohyang, Mt. Gungang, and Gaesung (N. Korea).

*Distribution.* Korea (GW, GG, GB, JN, JJ), Japan, and Europe.

*Host plants.* *Populus macimowiczii* H. and *Salix* sp. (Salicaceae) (For. Res. Inst., 1969; Park, 1983b), *Pyrus serotina* R. (Rosaceae) and *Quercus* sp. (Fagaceae) (Park, 1983a), *P. ussuriensis* var. *macrostipes* (Nak.) T. Lee (Rosaceae) (Park, Choi, and An, 1988), *P. ussuriensis* var. *macrostipes* (Nak.) T. Lee (Rosaceae) and *Quercus* sp. (Fagaceae) (Jeong, Lee, and Byun, 1995) in Korea.

*Remarks.* This species was originally described, based on a female from Japan by Leech (1889). Moths are collected from the late of June to the late of August in Korea.

### ***Nephoterix exotica* Inoue 반갈색알락명나방**

(Figs 2, 11, 18, 24)

*Nephoterix exotica* Inoue, 1959, *Tinea* 5: 296, figs 5, 6. TL: Japan.

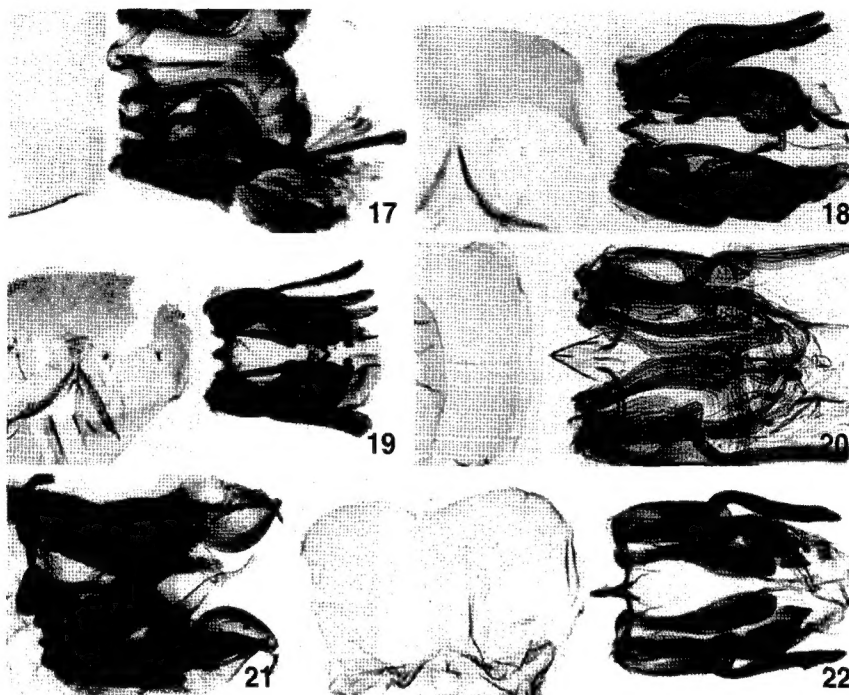
*Nephoterix exotica*: Inoue, 1982, 1: 391, 2: 250, pl. 47: 30; Park, 1993, 32 (2): 164; Check list Ins., Korea, 1994: 338.

*Diagnosis.* This species can be easily distinguished from the other related species by the both sides of median line and submarginal line of forewing with black lines.

*Adult* (Fig. 2). Wing expanse, 24–26 mm. Head pale yellowish brown mixed with blackish brown. Labial palpus large, strongly upturned, blackish brown mixed with dirty white. Antenna dark brownish gray, with sensilla trichodea of flagellum moderately abundant; male broadly swelled at base of flagellum, blackish brown. Thorax blackish brown. Ground color of forewing above dark brownish gray mixed with dirty white; basal area reddish brown; antemedian line and submarginal line dirty white; both sides of median line and submarginal line with black lines; two small discal dots on discocellular; submarginal line waved. Hindwing fuscous.

Male genitalia (Figs 11, 18). Uncus rectangular, lateral side with rather long hairs, shallowly split at apex. Apical process of gnathos slender, slightly hooked, pointed at apex; juxta U-shaped, with rather stout lateral arm. Valva narrow, rounded at apex; costa sclerotized; harpe semiquadrate, with small hairs; sacculus narrow, weakly developed. Vinculum broad, shallowly split at base, almost of same length as valva one. Aedeagus short, almost of same length as valva; cornuti thorn-like, three, large, different size. Structure of 8th abdomen shown in fig. 18.

Female genitalia (Fig. 24). Apophysis anterioris rather short, almost of same length as posterioris one. Ostium bursae large. Ductus bursae membranous, consist of numerous small granular at basal area. Ductus seminalis basally broad, membranous, originating from near swelled posterior part of corpus



**Figs 17-22.** Phycitinae spp., 8th abdominal tergites: 17. *Nephopterix bicolorella* Leech; 18. *Nephopterix exotica* Inoue; 19. *Nephopterix paraexotica* sp. nov., holotype; 20. *Nephopterix maenamii* Inoue; 21. *Nephopterix immatura* Inoue; 22. *Nephopterix fumella* (Eversmann).

bursae. Corpus bursae ovate, densely covered with numerous short spines on posterior 2/3 area; signum rudimentary.

*Material examined.* GW- 2 ♀, Jinbu-ryeung, Injae, 7 VII 1998 (Bae, Ahn, & Kim), UIB, gen. sl. no. UIB-1820 (♀); 1 ♀, Sogumgang, 6 VII 1988 (H.Y. Choi), CIS, gen. sl. no. UIB-2326 (♀); 1 ♂, Seomyeon, Yangyang, 30 VI 1997 (K.T. Park), CIS; 1 ♀, Mt. Balgyo, Hweongsung, 7 VII 1998 (Paek, Lee, Kim, & Song), UIB; 1 ♀, Mt. Gariwang, 8 VII 1998 (Paek, Lee, Kim, & Song), UIB; 1 ♂, Hongcheon, 24 VI 1989 (K.S. Lee), CIS; 1 ♂, Mt. Chiak, 12 VII 1997 (Y.B. Bae & N.H. Ahn), UIB, gen. sl. no. UIB-1796 (♂), 1 ♂, same locality, 16 VII 1998 (Bae, Ahn, & Kim), UIB. GG- 1 ♀, Mt. Myeongseong, Cheolweon, 20 VII 1999 (Paek, Lee, & Oh), UIB; 1 ♂, Mt. Hwaak, 19 VIII 1998 (Bae, Lee, & Kim), UIB. GB- 1 ♂, Mt. Sokri, 17 VII 1998 (Paek, Ahn, & Kim), UIB; 1 ♀, Mt. Juwang, 16 VII 1999 (Lee, Kim, & Kim), UIB; 1 ♂, Mt. Baekam, 15 VII 1999 (Lee, Kim, & Kim), UIB.

*Previous Record.* Park (1993): Mt. Daesung and Mt. Myohyang (N. Korea).

*Distribution.* Korea (SP, NP, GW, GG, GB) and Japan.

*Remarks.* Moths are collected from late June to mid August in Korea.

***Nephopterix paraexotica* sp. nov.** 작은반갈색알락명나방 (신칭)

(Figs 3, 12, 19, 25)

*Diagnosis.* This new species is very similar to *N. exotica* Inoue in the superficial appearance, but it can be distinguished from the latter by the very small size (15–18mm) and the basal area of costa of forewing is broadly suffused dirty white scales.

*Adult* (Fig. 3). Wing expanse, 15–18 mm. Head blackish brown mixed with dark brownish gray. Labial palpus strongly upturned, blackish brown, with scattered whitish scales at the inner surface. Antenna blackish brown, with sensilla trichodea of flagellum moderately abundant; male rather broadly swelled at base of flagellum, blackish brown. Thorax blackish brown. Ground color of forewing above dark brownish gray mixed with dirty white; basal area reddish brown mixed with dark brownish gray; basal area of costa dirty white; antemedian line and submarginal line dirty white; two small discal dots on discocellular. Hindwing smoky fuscous; basal half rather paler than distal half.

Male genitalia (Figs 12, 19). Uncus semirectangular, lateral side with rather long hairs, shallowly split at apex. Apical process of gnathos subtriangular, pointed at apex; juxta ovate-like plate. Valva sickle-like, slightly convex; costa well sclerotized; harpe semiquadrate, with small dents; sacculus rather broad, weakly developed. Vinculum short, about 0.8 times as long as valva. Aedeagus short, almost of same length as valva; cornuti thorn-like, three, large, different size. Structure of 8th abdomen shown in fig. 19.

Female genitalia (Fig. 25). Apophysis anterioris rather short, almost of same length as posterioris. Ostium bursae large. Ductus bursae membranous, consist of numerous small spines at basal half. Ductus seminalis basally broad, membranous, originating from near swelled posterior part of corpus bursae. Corpus bursae oblong, densely covered with numerous short spines on posterior 2/3 area; signum rudimentary.

*Etymology.* The species *paraexotica* sp. nov. indicated the superficial resemblance of this new species with *N. exotica* Inoue name.

*Material examined.* Holotype: 1 ♂, Temp. Yonggung, Is. Yongjong, Gyeonggi-do, Korea, 15 VI 1998 (Bae, Paek, Lee, & Ahn), UIB, gen. sl. no. UIB-2076 (♂). Paratype: Korea: GG- 1 ♀, Temp. Yonggung, Is. Yongjong, 13 VIII 1996 (Paek, Lee, & Ahn), UIB, gen. sl. no. UIB-1813 (♀). CN- 1 ♂, Onyang, 27 VI 1990 (S.H. Oh & H.Y. Choi), CIS.

*Distribution.* Korea (GG, CN).

*Remarks.* Moths are collected from mid June to mid August in Korea.

### ***Nephopterix maenamii* Inoue 남방알락명나방**

(Figs 4, 13, 20, 26)

*Nephopterix maenamii* Inoue, 1959, *Tinea*, 5: 295, fig. 4. TL: Japan.

*Nephopterix maenamii*: Inoue, 1982, 1: 391, 2: 250, pl. 47: 28; Choi, Paek, and Bae, 1999, 16 (1): 16, figs 1, 7, 13, 19.

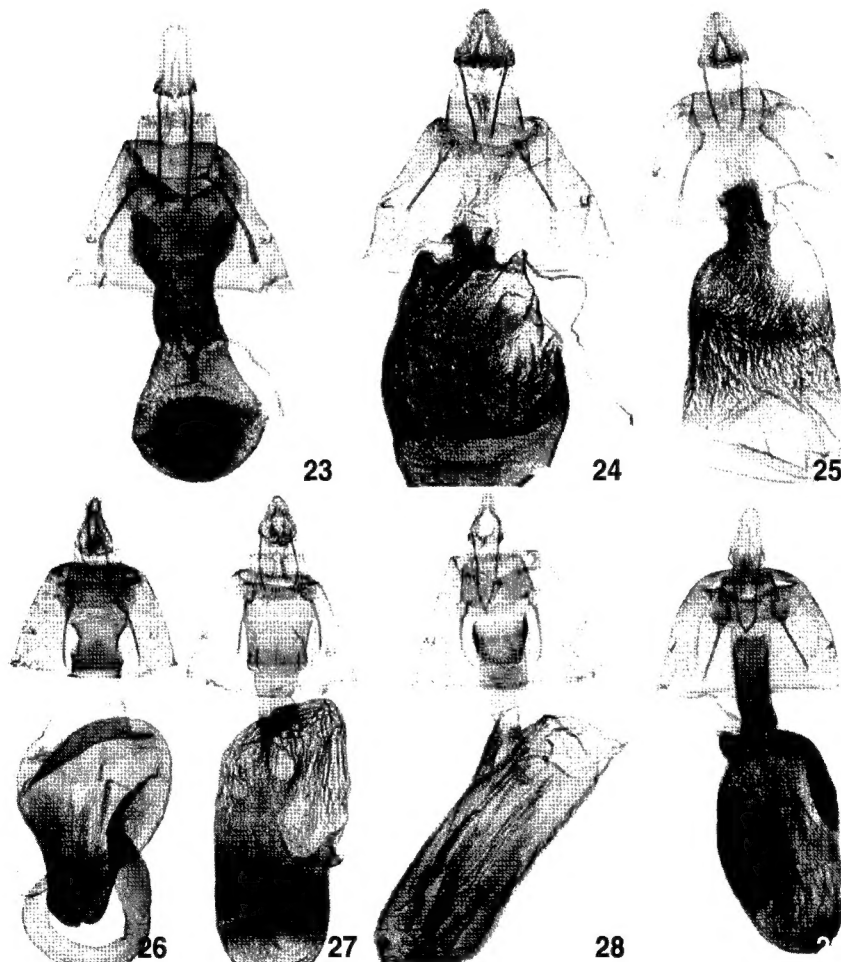
*Diagnosis.* This species can be separated from the similar species, *N. immatura* Inoue, but it can be distinguished from the latter by the thick, dark yellowish brown median line, and the slightly bent submarginal line of the forewing.

*Adult* (Fig. 4). Wing expanse, 23–26 mm. Head dark grayish brown mixed with pale yellowish brown. Labial palpus large, strongly upturned, dark grayish brown. Antenna pale yellowish brown, with sensilla



trichodea of flagellum moderately abundant; male broadly swelled at base of flagellum, silvery white; sinus distinct. Thorax dark grayish brown mixed with pale yellowish brown. Ground color of forewing above grayish brown mixed with dirty white; antemedian line broad, dark yellowish brown; median area of dorsum with distinctly whitish patch; two small discal dots on discocellular; submarginal line pale grayish brown. Hindwing smoke fuscous; basal half rather paler than distal half.

Male genitalia (Figs 13, 20). Uncus long subtriangular with pointed apex, dorsally covered with very short hairs. Apical process of gnathos arrowhead shaped, slightly hooked, pointed; juxta near V-shaped. Valva narrow, rounded at apex; costa well sclerotized; harpe semicircular, with small hairs; sacculus rather broad, developed. Vinculum sclerotized, rectangularly developed, almost of same length as valva one. Aedeagus large, about 1.4 times as long as valva. Structure of 8th abdomen shown in fig. 20.



**Figs 23-29.** Phycitinae spp., female genitalia: 23. *Nephopterix bicolorella* Leech; 24. *Nephopterix exotica* Inoue; 25. *Nephopterix paraexotica* sp. nov., paratype; 26. *Nephopterix maenamii* Inoue; 27. *Nephopterix immatura* Inoue; 28. *Nephopterix tomisawai* Yamanaka; 29. *Nephopterix fumella* (Eversmann).

Female genitalia (Fig. 26). Apophysis posterioris almost of same length as anterioris. Ostium bursae sclerotized, large. Ductus bursae short, membranous, basally broad; colliculum medially convex, rather short, about posterior half of ductus bursae. Ductus seminalis broad, membranous, originating from near middle of corpus bursae. Corpus bursae moderately oval, shallow anteriorly divided; signum rudimentary.

*Material examined.* GW- 1 ♀, Mt. Gyeong, 2 VIII 1989 (K.T. Park), CIS, gen. sl. no. CIS-1006 (♀); 1 ♂, Mt. Jeombong, 11 VIII 1997 (Paek, Lee, Jang, Choi, & Kim), UIB, gen. sl. no. UIB-1685 (♂). JN- 1 ♀, Mt. Deogyu, 18 VII 1998 (Bae *et al.*); UIB, gen. sl. no. UIB-1828 (♀).

*Distribution.* Korea (GW, JN) and Japan.

*Remarks.* Moths are collected from late July to mid August in Korea.

### ***Nephoterix immatura* Inoue 황토색알락명나방**

(Figs 5, 14, 21, 27)

*Nephoterix immatura* Inoue, 1982, 1: 392, 2: 250, pl. 47: 29, 311: 4, 314: 2. TL: Japan.

*Nephoterix immatura*: Choi, Paek, and Bae, 1999, 16 (1): 16, figs 2, 8, 15, 20.

*Diagnosis.* This species is very similar to *maenamii* Inoue in the superficial appearance, but it can be distinguished from the latter by the narrower median line of the forewing.

*Adult* (Fig. 5). Wing expanse, 21–23 mm. Head dark pale grayish brown. Labial palpus strongly upturned, dark grayish brown; basal and median segments covered with pale grayish white scales at inner surface. Antenna pale yellowish brown, with sensilla trichodea of flagellum moderately abundant; male rather broadly swelled at base of flagellum, silvery white. Thorax brownish fuscous. Ground color of forewing above grayish brown mixed with dirty white; costal area broadly suffused dirty white scales; median line narrow, pale grayish brown; two small discal dots on discocellular; submarginal line pale grayish brown, slightly bented; small white bar on about 1/2 of dorsum. Hindwing smoke fuscous; basal half rather paler than distal half.

Male genitalia (Figs 14, 21). Quite similar to those of preceding species, *maenamii* Inoue, but can be separated from the latter by the rather broader valva and shorter aedeagus. Structure of 8th abdomen shown in fig. 21.

Female genitalia (Fig. 27). Apophysis posterioris long, about 1.4 times as long as apophysis anterioris. Ostium bursae large, simple rounded, long cylindrical. Ductus bursae short, membranous. Ductus seminalis membranous, broad, originating from near middle of corpus bursae. Corpus bursae oblong, strongly wrinkled; signum rudimentary.

*Material examined.* GG- 1 ♀, Suwon, 10 IX 1974 (J.C. Paik), NIAST, gen. sl. no. UIB-1843 (♀), 1 ♂, same locality, 20 VI 1982 (C.H. Ryu), CIS, gen. sl. no. CIS-2779 (♂), 1 ♀, same locality, 19 VII 1982 (C.H. Ryu), CIS, gen. sl. no. CIS-2780 (♀); 1 ♀, Mt. Hwaya, 5 IX 1998 (M.K. Paek & B.W. Lee), UIB.

*Distribution.* Korea (GG) and Japan.

*Host plant.* Unknown.

*Remarks.* Moths are collected from late June to mid September in Korea.

***Nephoterix tomisawai* Yamanaka** 작은남방알락명나방 (신칭)

(Figs 6, 15, 28)

*Nephoterix tomisawai* Yamanaka, 1986, Tyô to Ga, 36 (4): 169, figs 2, 9, 14, 23. TL: Japan.

**Diagnosis.** This species is similar to *Assara terebrella* (Ragonot) in the superficial appearance, but it can be distinguished from the latter by the obscurely whitish patch central area of the forewing.

**Adult** (Fig. 6). Wing expanse, 20–22 mm. Head fuscous mixed with whitish brown. Labial palpus strongly upturned, dark grayish brown. Antenna dark grayish brown, with sensilla trichodea of flagellum moderately abundant; male broadly swelled at base of flagellum, blackish brown. Thorax grayish fuscous. Ground color of forewing above dark gray mixed with dirty white; antemedian line dirty white, slightly curved; two small discal dots on discocellular; submarginal line grayish dirty white, slightly bented. Hindwing smoky gray.

**Male genitalia** (Fig. 15). Uncus triangular with rounded apex, dorsally covered with very short hairs. Apical process of gnathos arrowhead shaped, slightly hooked, pointed at apex; juxta ovate plate. Valva rather narrow, rounded at apex; basal 2/3 of costa well sclerotized; harpe small, semicircular, with small hairs; sacculus narrow, weakly developed. Vinculum rather long, almost of same length as valva. Aedeagus large, about 1.3 times as long as valva; cornutus thorn-like, large, strongly sclerotized.

**Female genitalia** (Fig. 28). Apophysis posterioris rather long, about 1.2 times as long as apophysis anterioris. Ostium bursae large. Ductus bursae broad, with small numerous minute dented at inner surface; colliculum long, almost of same length as posterioris. Ductus seminalis, membranous, originating from near a third of posterior of corpus bursae. Corpus bursae oblong, numerous small granular on inner surface; signum rudimentary.

**Material examined.** GW– 1 ♀, Jinbu-ryeung, Injae, 7 VII 1998 (Bae, Ahn, & Kim), UIB; 1 ♀, Mt. Chiak, 12 VII 1997 (Y.B Bae & N.H. Ahn), UIB, gen. sl. no. UIB-1618 (♀), 2 ♀, same locality, 24 IV 1998 (Bae, Paek, Lee, Ahn, & Kim), UIB. GG– 1 ♀, Gwangneung, 13 VII 1998 (B.K. Byun), FRI; 1 ♀, Mt. Yongmun, 30 VI 1998 (Lee, Ahn, & Kim), UIB; 1 ♀, Mt. Soyo, 7 VII 1996 (Bae, Paek, Lee, & Ahn), UIB. CN– 1 ♀, Mt. Manroe, Ginchon, 1 VIII 1998 (Y.S. Bae), UIB. GB– 3 ♂, 2 ♀, Mt. Sokri, 17 VII 1998 (Paek, Ahn, & Kim), UIB, gen. sl. no. UIB-2000 (♂); 1 ♀, Mt. Juwang, 16 VII 1999 (Lee, Kim, & Kim), UIB; 1 ♀, Mt. Sobaek, 17 VII 1998 (Paek, Lee, & Song), UIB. JN– 4 ♀, Mt. Baegun, Gwangyang, 19 VII 1998 (Bae *et al.*), UIB.

**Distribution.** Korea (GW, GG, CN, GB, JN) and Japan.

**Host plant.** Unknown in Korea; *Rhododendron mucronulatum* Turcz (Ericaceae) in Japan (Yamanaka, 1986).

**Remarks.** This species is new to the Korean fauna. Moths are collected from late July to early August in Korea.

***Nephoterix fumella* (Eversmann)** 가에기알락명나방 (신칭)

(Figs 7, 16, 22, 29)

*Phycis fumella* Eversmann, 1944, Fauna Lepid. Volgo-Uralensis: 558. TL: Russia.*Nephoteryx* [sic] *fumella*: Heriich-Schäffer, 1848, Syst. Bearb. Schmett. Eur. 4: 72, pl. 11: 169;

- Staudinger, 1871, Lapidopteren Catalog, I: 222.
- Salebria fumella*: Ragonot, 1893, in Romanoff. Mém. Lépid., 7: 355, 1901; *ibid.* 8: pl. 47: 6; Staudinger and Rebel, 1901: 33; Caradja, 1910, Dt. ent. Z. Iris, 24: 138; Rebel, 1910, in Spuler, Schmett., Eur., 2: 211; Cardja, 1916, Dt. ent. Z. Iris, 30: 12.
- Sciota fumella*: Palm, 1986, Danmarks Dyreliv 3: 41, pl. 1: 20, 23; Speidel, 1996: 170.
- Nephopteryx* [sic] *tristis* Alphéraky, 1880, Troudy Ent. Ross., 11: 47.
- Selagia nigerrimella* Caradja, 1916, Dt. ent. Z. Iris, 30: 11.
- Nephopteryx* (*Clasperopsis*) *nigerrimella*: Roesler, 1969, Ent. Z., Frankf.a.M., 79: 249, figs 3, 4.
- Nephopterix fumella*: Laasonen, 1983, Notulae ent., 63: 212; Sinev, 1986: 281, figs 302: 7, 8; Yamanaka, 1994, 14 (1): 39, figs 6, 9, 16, 21.

**Diagnosis.** This species is quite similar to *Sciota adelphella* (Fischer von Roslerstamm) in the superficial appearance, and they are hardly separable each other by the external characters. This species can be distinguished from *S. adelphella* by the very thickened vertical band of the inside of antemedian line of the forewing.

**Adult** (Fig. 7) Wing expanse, 22–25 mm. Head fuscous. Labial palpus strongly upturned, blackish brown mixed with dirty white. Antenna dark brownish gray, with sensilla trichodea of flagellum moderately abundant; male broadly swelled at base of flagellum, blackish brown. Thorax dark gray mixed with dark brownish gray. Ground color of forewing above brownish gray mixed with dirty white; basal area pale reddish brown mixed with dirty white; antemedian line dirty white, slightly waved; inside of antemedian line with thick, dark grayish brown vertical band; two small discal dots on discocellular; submarginal line brownish gray. Hindwing smoky fuscous; basal half rather paler than distal half.

**Male genitalia** (Figs 16, 22). Uncus rounded at apex, dorsally covered with short hairs, both lateral side shallowly concave. Apical process of gnathos arrowhead shaped, slightly hooked, pointed at apex; juxta U-shaped, weakly developed. Valva rather narrow, slightly pointed at apex; basal 3/4 of costa well sclerotized; basal area of costa with well developed process; harpe small; sacculus narrow, weakly developed. Vinculum rather long, well developed, almost of same length as valva. Aedeagus large, almost of same length as valva; cornuti thorn-like, two, large, different size. Structure of 8th abdomen shown in fig. 22.

**Female genitalia** (Fig. 29). Apophysis anterioris rather short, as long as apophyses posterioris. Ostium bursae large, weakly developed. Ductus bursae broad and long, strongly sclerotized; colliculum long, minutely dentate. Ductus seminalis basally broad, membranous, originating from near swelled posterior part of corpus bursae. Corpus bursae partly sclerotized, consist of numerous small granular, and mostly covered with very short spines; signum rudimentary.

**Material examined.** GW– 1 ♀, Bongmyeong-ri, Chuncheon, 25 VII 1999 (Bae *et al.*), UIB; 1 ♀, Mt. Samak, 22 VI 1989 (K.T. Park & B.K. Byun), CIS, gen. sl. no. CIS-2393 (♀); 1 ♂, Mt. Chiak, 11 VI 1999 (Bae, Lee, & Ahn), UIB. GG– 1 ♂, 1 ♀, Mt. Hwaak, 26 VII 1999 (Lee, Kim, & Kim), UIB, gen. sl. no. UIB-1998 (♀), 1999 (♂); 1 ♂, Gwangneung, 7 VIII 1986 (K.T. Park & U. Park), CIS, gen. sl. no. CIS-2352 (♂).

**Distribution.** Korea (GW, GG), Japan, Russia (Western Siberia, Far East), and Europe.

*Remarks.* This species is new to the fauna of Korea. Moths are collected from mid June to early August in Korea.

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